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# GHRIMES
## ON THE
## TEETH

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# THE TEETH

## PHYSIOLOGICALLY CONSIDERED:

THEIR

**DEVELOPMENT, DISEASE, PRESERVATION,**

AND

**REPLACEMENT.**

BY

SAMUEL GHRIMES,

SURGEON-DENTIST.

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LONDON:
HENRY RENSHAW, 356, STRAND.

1843.

LONDON: PRINTED BY H. I. AND A. STEVENS,
LITTLE TOWER STREET.

# PREFATORY REMARKS.

So much has already been said and written upon the Teeth, that this work may appear a superfluity; yet, when I have considered the empiricism that has existed in the profession—the attempts of many authors to enveil these organs in a degree of mystery—whilst the works of others, more capable of disseminating knowledge, have gone too far into the depths of the science for the general reader, yet few contained sufficient information for the student; and, added to this, have been published in a form and at a price that would at once prevent their popularity; I have conceived the idea

that a work which should give a general dissertation on a subject of such importance to every individual, was not entirely uncalled for; but whether I have accomplished that object, or whether such were in reality the case, has yet to be decided by that ordeal—the Public. It would therefore be but an error of judgment, were I to review my own production in a preface.

Were individuals to adopt a system of having their teeth periodically examined, and to award them the necessary attention for their preservation, I am convinced that they would more commonly be retained until an advanced period of life. This, however, is not usually the case; and the result is, that when decay has commenced, it is not discovered until the disease is far advanced, and has become of a formidable

character: such is also the case with the accumulation of tartar, which should be periodically removed; and more especially on the recovery from illness, during which it is more rapidly collected.

It was with the hope of arresting attention to the importance of this subject, and enabling persons to judge for themselves, whether their cases receive proper treatment, or whether any treatment is in reality necessary, that I commenced this little work. In its compilation it has been my wish to condense my matter as much as possible; and with a view to the accomplishment of this object, I have stated but simple facts, without enlarging upon them; I have omitted to increase my pages by the introduction of cases to support those facts, and which would, in my opinion, have given them more the appearance of new-founded

theories. But it has been my endeavour, by a condensation of its matter and a compression of its bulk, not only to decrease its price, but to render it a more constant companion for the toilet or the boudoir.

71, Baker Street,
Portman Square.

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# THE TEETH

## PHYSIOLOGICALLY CONSIDERED,

ETC. ETC.

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### THE TEETH CONSIDERED IN REFERENCE TO BEAUTY.

THE structure of man is so beautiful an evidence of the wisdom of the Creator, that the admiration of the anatomist cannot fail to be excited when he beholds the complexity and arrangement of the various organs which are united to form the human body, and the care which has been manifested to place the more delicate, and those performing the more vital functions, in situations of comparative security: as the brain within the cranium; the spinal cord, which is a prolongation of nervous mat-

ter, within a canal formed through the vertebræ, or spine; and the numerous organs (of nutrition, respiration, &c.) within the thoracic and abdominal cavities. And in the union of the whole, the regard which has been maintained to form an individual of the most perfect symmetry is equally worthy of admiration.

The various organs have been made subservient to the accomplishment of this object. The muscles, which are necessary to volition, are so arranged as to fill concavities, and by giving a rounded form to the limbs, add to the beauty of the structure; many of them are not placed where their service is required, but take their origin or fixed point from a distant part, the muscular fibre terminating in a long tendon which extends to the part to be put in motion by its action: thus, the tendon allows the bulky muscular fibre to be removed from the position which it would otherwise have occupied. This is the case with the wrist, which remains of slender proportions, while the muscles that straighten the fingers and hand are collected

upon the fore arm, giving to that part a delicate roundness. The muscles of the leg are similarly disposed; and it is by such means as these that a remarkable superiority of form has been acquired.

Now this symmetry of structure having been attained, whenever any irregularity exists it strikes the eye as a deformity, and there is none more common than that of the teeth. Whilst from the prominent situation which those organs occupy, the opening of the lips or a smile immediately displays their colour and regularity; whereas, their bad arrangement, decay, or loss has a very unpleasing effect. What can be more deplorable than to see the characteristics of youth and beauty disfigured by the decay or loss of the teeth?—or more detractive from the loveliness of that sex whom it should be man's attribute to see all smiles and happiness?

The form of the mouth and general contour of the countenance are regulated by the presence and position of the teeth, and their loss

is perhaps one of the greatest ravages that nature can make upon the features. To beauty they are essentially requisite, through the vast influence which they maintain over the formation of that oval outline of the countenance which is universally acknowledged to be necessary to its perfection.

There are two malformations which are more especially destructive of this correct outline of the features. One of these is the projecting chin, where, from the under teeth being prominent, when the mouth is closed those of the upper jaw fall within their range: this irregularity is familiarly though rather inelegantly termed "underhung." The other, is when the front teeth project farther than usual beyond the perpendicular line of the face if viewed in profile. There are innumerable other irregularities; I mention these here, however, as the most formidable, and injurious to beauty, but shall refer to them when treating more particularly upon irregularity.

The loss of the teeth causes a contraction of

the features and the premature appearance of old age. When the back teeth have been removed, the cheeks fall in, and present a hollow or sunken appearance; if any of the front teeth are out, it is easily perceived, and the vacancy is a great disfigurement. But when the whole of the teeth of both jaws are lost, the chin and nose come into close approximation, the loss in depth not being only to the extent of the perceptible part or bodies of the teeth, but the alveoli or bony sockets soon become absorbed, and the loss sustained is nearly the length of the upper and under teeth if in apposition, including the fangs; being on an average about $1\frac{1}{2}$ inches.

## THE TEETH CONSIDERED IN REFERENCE TO SPEECH.

THE deformities with which various individuals are afflicted, are so continually brought under our notice in every-day life, that they cannot fail to be a subject of observation: many of them it is beyond the power of mortal to alleviate; through the advanced state of science and physiological research, however, the cure of others may be effected. It is only within a few years, that the common deformity of squinting has been found to be obviated by a most simple operation of surgery, the mere division of one of the small muscles of the eye-ball, which from its imperfect development had caused the deformity. Now the irregularity that most frequently exists is that of the teeth, and this, unhappily, has in most instances been caused by the neglect of the parents, or improper advice which they may have had during

the period of the second dentition. But this irregularity is not only a deformity to the eye, but also produces a lamentable defect in that art which is not only necessary for the bar, the pulpit, or the senate oratory—but even in social life has the unpleasing effect of a defective articulation.

Many of the organs of the body are known to perform other functions besides those to which they are more especially essential. Thus the bones which form the skeleton not only support the body, but give attachments or fixed points of action to the muscles: the lungs are the organs of respiration, which if not the only, is by far the principal source of animal heat; whilst it also, by the elimination of carbon, changes the blood from venous to arterial; without which change asphyxia and death would result. In like manner do the teeth perform a two-fold function, being alike necessary to speech and mastication.

The voice, or sound, is produced by the air

expelled from the lungs rushing through the larynx and glottis. Being produced, it has as it were to be expressed, which power is only perfectly possessed by the human race. It is expressed, or articulated, by various actions of the lips, and the tongue against the teeth and palate; and then what was previously but vocalised air, or musical sound, is speech.

It is a necessary auxiliary to the perfect utterance of words, that the teeth should be evenly and continuously arranged. If any of the teeth in either jaw project beyond the range, the proper action of the lip will be impeded, and the pronunciation consequently imperfect; or if the irregular tooth or teeth incline inwardly, there will be a defect in the pronunciation of those consonants which grammarians call dentals, from the inequality with which the tongue will come in contact with the backs of the teeth. The irregularities which I have before alluded to, will cause imperfect speech; that where the whole of the

teeth are prominent, by impeding the free action of the lips; whilst that of projecting chin causes an unpleasant lisping.

In cases where any of the front teeth are deficient, there is a disagreeable hissing sound when the person is speaking, caused by a portion of the air rushing through the vacancy unarticulated. And this is also accompanied by some of the saliva being ejected at the same time, which however unpleasant to the individual, is beyond his power to repress.

## THE TEETH CONSIDERED IN REFERENCE TO HEALTH.

In the consideration of this division of the subject, it will not require the exertion of the highest intellectual powers to enable us to observe how necessary these organs are for mastication. Digestion is one of the primary and most important functions of the animal economy, and may be said to consist of various stages: the first, on the food being assumed by the individual, being mastication; this process is necessary for the fine comminution of the food, and causes it meanwhile to become intimately blended with the saliva, which not only assists deglutition, but on the food reaching the stomach, from an influence exerted by the chemical composition of the saliva with which it had been previously moistened, it is rendered much more easily soluble by the gastric juice.

Without, therefore, the food thoroughly un-

dergoes this, the first process, it must necessarily result that the digestion will be impaired; and I am convinced that many individuals undergo a course of medicine, with the hope of repairing a function over the proper exercise of which the teeth maintain so vast an influence, where the disease is not owing to a disordered state of the internal organs, but to disease or deficiency of the organs of mastication—the teeth. And even to a large proportion of persons, where their loss has been replaced, the artificial substitutes are perfectly useless for mastication; it not being the principle of many members of the profession to pay any regard to the accomplishment of this object, perhaps from carelessness, perhaps from incapacity, as the greatest possible accuracy in the adaptation of the appliances of dental mechanism is necessary to their answering this purpose.

Diseases of the teeth exercise a very prejudicial influence on the health, by causing the breath to be tainted; not only rendering it foul

in expiration, but the air that is inspired, however pure, must become foul before entering the lungs. It is very evident that decayed teeth will produce this injurious effect, both from the decay itself, and from the cavities which it presents for the accumulation of putrescent matter. In some cases, however, where the teeth are sound, if unattended to, depositions of tartar take place, sometimes to a very considerable extent; this irritates and causes great tenderness of the gums, and the tendency to its accumulation is considerably increased by any irregularities of the teeth, which prevent the tooth-brush from penetrating the inequalities. The bad effects resulting from an increased deposition of the tartar, are, that it displaces the gums from the teeth, produces absorption of their sockets, and in some constitutions the irritation produced is so great as to occasion ulcerations of the gums, cheeks, and tongue.

Without regard to the injurious effects of this accumulation upon the teeth and gums

themselves, the uncleanliness renders the breath exceedingly foul, and, consequently, most pernicious in respiration.

We have seen, therefore, that disease and deficiency of the teeth are equally detrimental to beauty, speech, and health; and when we consider them as regards the latter, which is the greatest blessing with which man can be endowed, that circumstance should prove our strongest incentive to their preservation.

## THE STRUCTURE AND DEVELOPMENT OF THE TEETH.

Every tooth is divided, by anatomists, into three parts: these are,—first, the crown or body, being the portion above the gum, and exposed to view in a healthy state; second, the root or fang, that part which is concealed being inserted into the alveolar socket, and fixed by an articulation called *gomphosis*, from the Greek signification, *to drive in a nail;* the third, is the neck, or cervex, which forms the demarcation between the other two portions.

The whole tooth, or what is more properly, in the living state, the hard part, presents three substances—ivory or dentine, enamel, and crusta petrosa. The ivory, or dentine, forms the mass of the tooth; it resembles bone in composition, containing earthy and animal matters, and differs only from bone in their proportions, as it contains more earthy matter. It loses this if steeped in acid; whilst, in con-

sequence of the animal matter which enters into its composition, the bony part of a tooth becomes black by burning, whereas the enamel will retain its whiteness. It appears quite compact to the naked eye; but on looking at a thin layer under the microscope, it is found to be made up of a number of minute tubes, commencing at the pulp cavity and running to the surface.

The enamel covers the whole of the crown of the tooth; being thicker on those parts that are exposed to friction, as the grinding surfaces and edges of the teeth, from whence it diminishes in thickness until it reaches the neck, where it terminates imperceptibly. This is the hardest substance in the body; it is composed of earthy and animal matters, but only contains about two per cent. of the latter. It is arranged in laminæ perpendicular to the surface; and if viewed under the microscope, is found to be made up of four or six-sided prismatic fibres, not much more than 1-5,500th of an inch in diameter.

The crusta petrosa much resembles bone ; it exists in very small quantity in human teeth, having been unobserved till within a few years ; but is found in much greater proportion in the teeth of the elephant, horse, ox, and other animals : it covers the outside of the fang, and lines the internal cavity of the tooth.

Within the tooth is a cavity which contains a fleshy pulp, in form nearly similar to the tooth itself ; processes from it run into the fangs, where there are apertures for nerves and blood-vessels. This pulp is vascular and highly sensible, and, from its exposure in disease, is the cause of toothache.

Were I to give a minute description of the formation or development of the teeth, it would require more pages exclusively devoted to that subject than I intend the whole of this little work to contain : I shall therefore consider it sufficient and more interesting to the non-professional reader to give but a brief outline.

The rudiments of the teeth begin to be formed at a very early period : the pulps of the

whole of the temporary teeth, of the first permanent molares, and occasionally of others of the permanent set, are formed before birth. Each pulp or rudiment grows at the bottom of a vascular membranous sac, in which it is contained; they become enlarged, and at the time of birth, every one of the first set, and the anterior permanent molares, have begun to ossify.

The incisores and canines begin to ossify from one point; the bicuspides, usually from two; and the molares, from as many points as the tooth will afterwards have eminences. When the crown of the tooth is formed, the pulp elongates to form the root, and around this ossification continues; the pulps of those teeth which have two or three fangs divide into as many portions as the tooth will ultimately have roots. When the ossification of the crown is completed, the inner membrane of the sac becomes thickened and highly vascular; and from this a deposition of the enamel takes place upon the bony shell.

As ossification proceeds, the pulp shrinks,

and is eventually retained in a cavity within the tooth. It has nearly the shape of the tooth itself, and remains as long as the tooth retains vitality, receiving nerves and blood-vessels through a small aperture in the fang.

## THE FIRST DENTITION.—TEMPORARY TEETH.

THE teeth of the first dentition have been often termed the deciduous, or milk teeth; they are twenty in number, ten in each jaw: viz. two central incisores, occupying, as their name implies, the central position; two lateral incisores, being the second tooth from the centre of the mouth on each side; two cuspidati, or canines, the third from the centre on each side; and four molares, being the fourth and fifth teeth from the centre of the mouth.

The periods of cutting these teeth is exceedingly various: examples are not uncommon of infants being born with one or more teeth already through the gum; whilst in other instances they have not been cut till the child was twelve or fourteen months old, or when it has even been delayed till the second or third year. These, however, are decidedly abnormal cases,

and the following is the order in which they generally make their appearance; each two under teeth usually preceding the corresponding upper ones by a short period, perhaps fifteen or twenty days :—

From 5 to 8 months, the four Central incisores
From 7 to 10 months, the four Lateral incisores.
From 12 to 16 months, the four Anterior molares.
From 14 to 20 months, the four Cuspidati.
From 18 to 36 months, the four Posterior molares.

When the teeth make their appearance through the gums, it is indicative of that period of infancy having arrived when more solid food may be substituted for that which has previously nourished the child. Mr. Bell makes some very excellent remarks upon this subject, which I shall take the liberty of transcribing: he says, "It were well if the indications which nature affords us in this and in many similar instances were regarded with a degree of interest commensurate with their importance. The absolute absence of teeth for the first six or seven months, clearly points out the impropriety of

introducing any solid food during that period; and by those who take nature as their guide, will be deemed sufficient to induce them to restrict infants to that food which has been so bountifully provided for them, and for which alone the delicate state of the digestive organs is at first adapted; whilst the time at which the change now under consideration takes place is so defined—the change itself of so decided a character—and the object of its occurrence so obvious, that, under ordinary circumstances, it may almost be assumed as a law by which to regulate the period during which the maternal nourishment is required."

The eruption of the deciduous teeth usually proves a very troublesome and even dangerous period with children, during which they require more the attention of the physician than the dentist; for though the immediate disorder is local, its consequences are constitutional from sympathy. The irritation produced by the growth of the teeth, by their pressure upon the gums, and a counter pressure upon the pulps

on which ossification of the fangs is still continuing, is the great cause of the febrile affections, convulsions, and numerous other disorders of infancy. Topical remedies may sometimes have a beneficial effect; of these the principal is the lancet; but, when necessary, it should be used by an experienced operator, otherwise much ill may accrue. From the manner in which unfortunately it is often applied, it injures the rudiments of the permanent teeth, which are in close apposition and attached by a pedicle to the temporary, or breaks away the delicate bony partitions which are ultimately to form the alveoli or sockets. But if the gum be lanced in a proper manner, it will often prove serviceable, and cannot be attended with any of the ill effects which the prejudice of some nurses lead them to believe, from an old notion that it was injurious; which I apprehend to have originated from the injudicious method of performing the operation that I have previously reprobated.

The whole of the temporary teeth have

usually made their appearance by the time the child has attained the age of two and a half or three years, and should be retained till about the seventh year.

An erroneous idea unfortunately exists, that it is unnecessary to exert any care in order to preserve these teeth, from a knowledge of their being *only* the first set. I may, however, mention several especial necessities for their preservation. In the first place, it is as requisite that the child should possess teeth for the proper mastication of its food, as the adult; secondly, from the connexion maintained between the temporary tooth and the permanent one which is to succeed it, the sac of which is, as I have stated, attached by a pedicle to the neck of the temporary, it must result that this attachment will be ruptured with the loss of the deciduous tooth; and thirdly, it is necessary to retain them, in order to encourage the enlargement or growth of the jaws.

The temporary teeth are more liable to decay than their successors, from their less perfect

structure, only being intended to perform their office for a limited period. They should never if possible be extracted, on this account: but it will rather be found advisable to stop them, as is the practice with the permanent teeth, in order to make them serviceable and prevent toothache. Cleanliness is of the greatest importance to prevent decay, or, where it has commenced, to retard its progress; children should therefore be taught the free use of the tooth-brush as soon as they are capable of using one.

## THE SECOND DENTITION.—PERMANENT TEETH.

THE full number of the adult or permanent teeth is thirty-two—sixteen in each maxilla; their position, commencing from the centre of the mouth in each jaw, is indicated by the following table:—

| | | | | | Centre of the Mouth. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 Molares. | 2 Bicuspides | 1 Cuspidatus or Canine. | 1 Lateral Incisor. | 1 Central Incisor. | 1 Central Incisor. | 1 Lateral Incisor. | 1 Cuspidatus or Canine. | 2 Bicuspides | 3 Molares. |

The teeth of each class in the permanent set are larger than those of the temporary, with the exception of the deciduous molares, or grinders, these being replaced by a class of teeth which had not existed in the former set, called bicuspides, from their having two points; the internal point, however, is but slightly marked in the lower ones; they have also been called

small grinders, from their intermediate character between the single and double teeth. The bicuspides being smaller than the molares which preceded them in the first set, makes some allowance for the increased breadth required by the front teeth of the second, which are larger than their predecessors.

The anterior molares are the first of this set to cut the gum, and usually make their appearance when the child is about six and a half years old, before any of the deciduous teeth are shed; one on each side of each jaw, posterior to the complete temporary set. Their appearance appears to give the earliest indication of the approaching change.

The first of the deciduous teeth that are replaced, are the inferior central incisores. As soon as the permanent tooth has arrived at that stage of development when it can no longer be retained *within* the jaws, absorption of the root of the temporary tooth commences; and proceeding, the tooth becomes loose. At last the whole of the fang being absorbed, the

crown comes away, with the appearance to the unpractised eye of having been broken off.

The period of the eruption of the permanent teeth is very irregular; the following, however, is about the time at which they are generally cut, the under teeth usually preceding the upper by two or three months.

About 6½ years, the First molares.
About 7 years, the Central incisores.
About 8 years, the Lateral incisores.
About 9 years, the Anterior bicuspides.
About 10 years, the Posterior bicuspides.
From 11 to 12 years, the Cuspidati.
From 12 to 13 years, the Second molares.
From 17 to 25 years, the Third molares, or Dentes sapientiæ.

The dentes sapientiæ sometimes, however, do not make their appearance till a very advanced period of life.

## IRREGULARITY OF THE TEETH.

IRREGULARITY is invariably caused by the neglect of the parents during the period of the eruption of the permanent teeth. During that epoch the mouth requires the constant attention of the dentist; not, however, for the wholesale destruction of the temporary teeth, as is, alas! too commonly the practice of some members of the profession, who seem to possess a wish to forestall nature in their removal, against all physiological principles or the exercise of common sense; and which would appear to be either attributable to charlatanism, or the sordid motive of deriving the fee for extraction, which, by a beautiful process of the vital functions, has been rendered in normal cases unnecessary.

Unfortunately, a work of some merited celebrity, which has long survived the author, sanctions this pernicious practice; and some professors, taking this perhaps alone as their

guide, have even surpassed in practice what had been observed in theory: "If, then, the permanent molares have been cut for some time, and there be a fulness of the gums behind the under temporary incisores, it will be expedient that the two central incisores be extracted immediately, *although not yet loose* *." Even in a later work, however, I find the following observation, in which I am sorry to differ with the author: "I have seen much mischief take place, as early as at six years of age, by the new central incisores of the lower jaw making their appearance under the tongue, and within the regular range of the temporary teeth, before the latter have shown the slightest disposition to fall †." Now I maintain that no mischief has taken place; it is, then, when the permanent incisores have made their appearance, but not till then, that the temporary ones should be extracted. In the generality of cases the fangs of the temporary teeth become absorbed, and the teeth come away naturally;

* Fox. † Nicholles.

and it is only in those cases where nature has neglected to perform her office, that she should be assisted. I assert, therefore, that no evil has arisen, and that when the permanent incisores appear before the others are shed—and let it be remembered this is only in abnormal cases—is quite time for the removal of the first teeth; and that the permanent will then take their proper places without even the assistance of art.

It is far from being my opinion that the teeth should be left entirely to nature; the mouth of the child should undergo frequent examination by the dentist. As I have before stated, the periods of cutting the teeth vary considerably; and it is only by constant attention at this time, in order that when it is necessary for a tooth to be removed its extraction should not be delayed, that confirmed irregularity will be prevented.

By the too early extraction of the temporary teeth a very prejudicial influence is exercised over the growth of the jaws, by inclining them

to contract, rather than preserve their form, and encourage their enlargement. Their principal growth is posterior to the entire temporary set, as it is behind these that the whole of the permanent molares are developed; still, however, the anterior portion, or that containing the temporary teeth, does increase, which is evident when they have originally been in close opposition, but afterwards slight spaces exist between them.

It would appear that man was intended to possess his full complement of teeth; and in order that regularity may be maintained, that portion of the jaws which was occupied by the deciduous teeth is not required to contain more than the same number of the permanent; and the difference in size of the temporary molares, and the permanent bicuspides which succeed them, makes a great allowance for the increased size of the front teeth of the second dentition. It is often the case that the permanent incisores, when first appearing, will not exactly occupy the position that they should; still we ought not to be too quick in the extraction of

other teeth to make room for them, for unless the irregularity is great they will become even naturally; this of itself proving that the fore part of the maxillary bones do increase in size.

There is another objection to early extraction, which is fully as important. I have already mentioned the connexion that exists between the sac of each permanent tooth, and the temporary one it is to replace—by means of a pedicle or cord being attached to the neck of the latter; hence it is necessarily impossible to extract the temporary tooth without the rupture of this attachment.

In a work I have before mentioned, it is said, "and the enamel, which I assert is undergoing a change during the whole period of life, and particularly when the process of growth is in full activity *." Now, though I cannot admit that the enamel is undergoing a constant change through life, that it is during the process of growth must be undoubtedly correct; and on the ground of the assertion of this incontrovertible fact, must I deprecate the

* Nicholles.

early extraction of the deciduous teeth. If, to allow the growth of the four incisores, the cuspidati are extracted, which is maintained by this gentleman to be advisable, an injurious effect must result on the rudiments of the corresponding permanent teeth, through the laceration of the cord; for let it be remembered, that they are then undergoing an important progress in their development, as they do not usually pierce the gums for two years after this period.

If, however, through inattention to the child's mouth during the growth of the teeth, permanent irregularity results, it is scarcely ever irremediable if scientifically treated: it would be, however, useless to lay down any especial mode of treatment; all must depend upon the science of the practitioner. For my own part, I have but little faith in the common plan of making *bars*, and using *ligatures;* but by the application of a slight continuous pressure, by means of a piece of peculiar construction—which it would be impossible for me to describe here from the want of plates—I have succeeded

in numerous cases beyond my utmost expectation.

Among the irregularities of the teeth, are those I have previously alluded to—projecting chin, and general prominence of the teeth; these during the period of the second dentition are both capable of *prevention*. When the former occurs, it is invariably caused at this period by the upper front teeth, when first cut, being inclined inwards; or perhaps, on closing the mouth, coming in contact with the under; this makes the child inclined to protrude the lower jaw, which becoming habitual and possibly promoting the increase in length of the jaw itself, is made the natural bite. The latter is generally produced by constitutional weakness during the growth of the maxillary bones; causing the circle of the mouth to become expanded. These can scarcely be considered as malformations; they are but irregularities, though of a formidable description, and will generally succumb to remedial measures if properly applied, and assisted by the patience of the individual.

## OF THE SALIVARY CALCULUS OR TARTAR.

This is an incrustation or calculus deposit, that takes place upon the teeth of all individuals to a greater or less extent. It is a deposition of the solid matter of the saliva; which is at first soft, but soon attains more consistency, and eventually acquires a great degree of hardness. It collects principally on the inner surface of the inferior incisores, and the external surface of the superior molares; this is most probably caused by the ducts of the salivary glands opening in these situations, the deposit taking place upon the inferior incisores from the saliva flowing from the ducts of the sublingual glands, and upon the superior molares from the parotids. There is a greater deposition upon the lower teeth generally than upon the upper; this circumstance may be easily attributed to the effect of gravitation.

In the mouths of some individuals the tartar

collects very slowly ; in others, to a very considerable extent. It begins to accumulate upon the necks of the teeth, immediately beneath the edge of the gum ; and, by its continued deposition, forces the gum to recede from the teeth and become absorbed, as do also the alveoli or sockets. It causes great irritation of the gums, producing often inflammation and ulceration. Any irregular or unhealthy action of the salivary glands causing an increased flow of the saliva materially promotes its deposition; therefore the action of mercury, indigestion, the abuse of vinous fermentations, fever, or other causes, will produce it much more rapidly.

Its ill effects may long escape the notice of the individual, through its affording a partial support to the teeth by uniting them together; yet this is but partial, and whenever any portion may break away, the fangs of the teeth are found entirely denuded, and the teeth consequently loose ; it is therefore the particular interest of the individual to prevent its formation. While in a soft state it is easily re-

moved, and only requires the constant use of the tooth-brush, which may be assisted by the use of tooth-powder, in the purchase of which great caution should be observed, as there is scarcely a tooth-powder sold but what is deleterious to the teeth themselves.

When the patient fails to prevent its accumulation, recourse must be had occasionally to the dentist. With some individuals this will be necessary every seven or eight months; whilst with others as many years may be allowed to elapse. It is removed by the means of instruments, in the use of which great care is requisite. I have several times known the inferior incisores to have been taken out by the practitioner's unskilful method of scaling the teeth. Small cases of teeth instruments are often purchased by persons under the supposition that they can perform the operation for themselves; but the attempt invariably proves futile, as there is a great art in performing the operation nicely; and if the whole of the tartar be not removed, if any small particles be

allowed to remain, they necessarily serve as nuclei for the accumulation of a fresh deposit. When it exists in any considerable mass, its removal at one operation will not be advisable, especially if the teeth are loose; in this case, an interval of several days should elapse before the second operation is performed.

## SCURVY OF THE GUMS.

THE effect of this disease on the gums, is either their absorption, as also that of the alveolar processes, thus denuding the fangs of the teeth; or much fulness and sponginess. It results, in either form, principally from some disordered state of the system, from indigestion, fever, the abuse of murcury, and other causes; though long after the cause has been removed from the system, the diseased action of the gums continues. That form of the disease in which the gums are spongy and turgid, is more properly scurvy; but when they become absorbed, it has usually been considered as a modification of the same disease. In the former, the gums bleed very readily on slight pressure, and are excessively tender; in consequence of which the tooth-brush is but little used, and as the disease advances, is perhaps abandoned altogether; which allows the disease to make

more rapid progress; the gums have also a great tendency to ulcerate. This form of the disease also produces absorption of the alveolar processes and inflammation of the dental periosteum; causing it to secrete a purulent matter, which on pressing the gum escapes from beneath its free edge.

The treatment of this disease is repeated scarifications of the gums. The lancet must be freely used to produce any benefit; and the mouth should be frequently washed with a strong astringent lotion.

## CARIES OR DECAY OF THE TEETH.

This disease does not commence, as is generally supposed, on the enamel of the tooth, but upon the surface of the bone beneath the enamel, by a dark spot, which, as it proceeds, causes a softening of that portion of the bone of the tooth that is affected; and, subsequently, from the want of a continuous support the enamel breaks in. The progress of the disease will then be more rapid, from the collection in the cavity of the saliva, and particles of food which become decomposed and putrescent. This disease, from the exposure of the internal membrane, is the cause of toothache.

Caries invariably commences upon the crown of the tooth. The teeth most commonly affected by the disease are the dentes sapientiæ; whilst those least subject to its attacks are the inferior incisores. The teeth of some individuals are

considerably more liable to its ravages than others, and in some cases this predisposition appears to be hereditary. It most commonly attacks the teeth in pairs, and often the corresponding pairs of each jaw. Let it be remembered that the teeth are developed in pairs, those of the upper and lower jaws varying but little in time; it is therefore but natural to suppose that they must be affected by any constitutional disorder, during their formation, which produces a greater or less predisposition to decay; and to this circumstance only, can be attributed the cause of their going in a corresponding manner.

The cause of caries is inflammation, which may be produced by cold, or other causes, the effects of which the tooth is unable to recover from the small degree of vitality that it possesses, though sometimes a tooth will show no indications of decay for some period after the inflammation has subsided. The destruction of any portion of the enamel also causes caries, possibly by exciting inflammation.

"Whatever tends to irritate and inflame the gum, must in a greater or less degree produce a corresponding irritation in the teeth, from the close connexion which subsists between them, and hence the accumulation of tartar; portions of food remaining between the teeth, or any similar circumstance, may possibly become an exciting cause of gangrene, and this not only by means of inflammation propagated through the gum, but also by the exposure of the necks of the teeth to external agents, in consequence of the absorption of the gum and alveolar processes*."

Caries may also be produced by the want of room in the maxillary arch to contain the whole of the teeth, and thus they press with much force against each other, which often injures the enamel, and eventually causes decay. When the whole of the teeth are perfectly sound, the evil should be prevented by passing an exceedingly fine file between each tooth; in doing this great care is necessary to

* Bell.

avoid taking the whole of the enamel off the side of either, or the bone of the tooth will thus be otherwise exposed to decay.

If caries is attended to immediately on the appearance of the disease, and the tooth is properly stopped, it may be retained and rendered perfectly serviceable for years. But on the manner in which this is done every preservative effect must depend; and I do not suppose there is any branch of science in which more charlatanism and empiricism have been displayed than in this. Some time since, a party of individuals advertised as being capable of stopping teeth with a substance which should exactly resemble the enamel; but from those who puffed this stopping, nothing could have been expected but the most unprecedented quackery; all that was used was a preparation of plaster of Paris, which of course would remain in the tooth but a very short time.

A preparation was recommended by Fox, composed of bismuth, lead, and tin, in stated proportions, and has since been extensively

used by numerous practitioners; who, from the improved state of dental science since the period when Fox wrote, had they *studied* their profession, would have been supposed to know better than to use it. The composition melts at the temperature of boiling water, or 212°, and is, while in a state of fusion, poured into the cavity of the tooth. Now, it is well known that any metal when heated will expand, and on cooling again contract; this is the case necessarily with this stopping; and I have seen teeth that have been so stopped, with the metal quite loose in the cavity. As this result must of itself render the effect of the operation perfectly abortive, I think it needless to describe the torture which must be inflicted upon the patient, or how fatally impolitic to the tooth itself must prove this attempt at cure.

Another of these useless cements, which has been termed anodyne, is prepared by a solution of some of the resinous gums in alcohol, and is applied to the tooth in a state of tolerable consistency. This is pretended to afford

immediate relief to all cases of simple tooth-ache. From the evaporation of the alcohol, this contracts as it becomes more consistent, and consequently is rendered equally as fallacious a remedy as the fusible metal before alluded to.

Advertisements continually appear of compositions "with which any individual can stop their own teeth, without applying to the dentist." Now the pretence of this being effectual is a perfect imposition. To render the operation permanently effective, as much depends upon the removal of the whole decayed part of the tooth, as upon the insertion of the stopping; it is therefore as impossible for the public to be able to perform this operation for themselves, as any of the minor operations of surgery.

As I have said, the whole of the carious portion of the tooth must be carefully cut away; for this purpose various little instruments are required for conveniently getting at the disease; which may occur at different parts

of a tooth and at various positions in the mouth. When this part of the operation has been carefully performed, the cavity must be wiped out with a little cotton wool, in order to remove all moisture, and then filled with gold, which is decidedly the best substance that has yet been discovered for this purpose, on account of its being far less liable than the other metals to become oxydized, as also its superior degree of ductility.

An amalgam was invented by the late Mr. Clark (under whom I commenced the study of the profession) that attained some celebrity, and which he used very extensively as a stopping. An imitation of this has been attempted by many individuals without being attended with the same success, from their having in its composition made it much more capable of oxydation. One member of the profession, however, considers it "truly pernicious;" and says, "the combined agency of the breath, the air, and the salivary secretions, decomposed the amalgam, turning it black; and the saliva

becoming impregnated with the discolouring matter, communicated the stain to all the other teeth*." I can only assign this assertion to one of two causes—either to a feeling of jealousy, or to the cases which had fallen under his notice having been cases of some of those who had attempted to imitate the composition of him whom this gentleman is pleased to term "the lucky inventor." In refutation of these remarks upon its injurious effects, I must mention, that I have a tooth in my own head which was stopped with this amalgam about eight years back, and which it still retains, the tooth itself being but a mere shell: I have never experienced any injurious effects from the *slight* degree of oxydation it has undergone; and so far from any discolouring matter derived from it staining the other

* I shall not insert the name of this author, as he is still living; and I wish to make no invidious remarks in any way calculated to injure the practice of a contemporary. Should this little work, however, at any time fall into his hands, he will possibly recognise a passage from his own.

teeth, they retain, as also does the tooth itself, their natural colour.

I have lately succeeded in effecting a great improvement in this preparation, and though in the generality of cases I prefer the use of gold, yet there are many to which it is not adapted, where the decay has proceeded to any extent, and in these I have found this composition most successful.

Having enumerated the several, and distinguished the most effectual means of plugging the teeth, I would, in concluding the subject, impress most particularly upon my readers, that the operation should *never be attempted* when the tooth is painful, or when the insertion of the stopping causes pain. When, however, there is but a slight tenderness in the tooth, it may often be rendered fit for stopping by the frequent application of spirits of wine on a piece of wool into the cavity.

*Toothache.*—There are, unfortunately, but few persons who have not, at some period of their lives, experienced this most excruciating

malady. It is caused by the inflammation of either the pulp or periosteum of the tooth; decayed teeth are therefore more especially liable to it, from the exposure of the pulp to the action of external irritants; though sometimes the decay of a tooth proceeds so gradually, that the membrane loses its vitality before it has become exposed. The pain is most probably caused by the inflammation producing an enlargement of the vessels within the tooth, which, from containing an increased quantity of blood, are pressed against the walls of the cavity; and their extreme sensibility, from their expansion being prevented, produces the toothache.

The disease, therefore, being inflammatory, the means adopted to give relief must depend upon the stage in which the inflammation may be. In an early stage, cooling applications will be beneficial. If the inflammation be considerable, topical bleeding should be had recourse to: for this purpose leeches to the gum are usually prescribed; but when, as is often

the case, the patient has a great antipathy to their use, the free use of the lancet will be advisable. What is commonly known by the name of gum-bile, is produced by the inflammation of the periosteum of the tooth having arrived at a suppurative stage. When this is the case, warm fomentations should be applied, and I have frequently found the application of a chamomile poultice to the face of great service: these means hasten the formation of the abscess; and when that period arrives, the lancet should be immediately applied, to allow the escape of the pus. The abscess should be laid completely open. Not giving vent to the purulent matter, is often the cause of very ill effects; as it will then, by its pressure, form an outlet for itself, by the absorption of the neighbouring parts, sometimes externally through the cheek or opposite the lower jaw. In the upper jaw the danger is still greater, as it often makes its way into the antrum maxillare, and sometimes occasions exfoliations of portions of the maxillary bone.

Creosote has been of late years much used as a remedy for toothache, and in many cases has proved effectual. But, as I have stated, the treatment must be guided by the stage of inflammation, as what will in one stage give relief, would in another be of no avail, or even hurtful. This will show the folly of persons, when suffering under any of

> "——— the thousand natural shocks
> That flesh is heir to,"

applying various nostrums which may be even recommended by a friend who has benefited by them, but whose disease, though the same, was in a very different stage; which would only be perceptible to the man who had made the study of those diseases his profession.

## CARE OF THE TEETH.

When all cannot fail to be aware of the value of the teeth to beauty, speech, and health, it is astonishing that more preservative care of them is not generally employed. Some persons use their teeth for perfect mechanical purposes ; as cracking nuts, and taking tightened stoppers out of smelling-bottles. These practices are exceedingly injurious, as also one which many ladies have, of biting the ends off thread; by which portions of the enamel are liable to be chipped off the cutting edges of the incisores, from their being pressed forcibly together. Another injurious effect to be avoided is, that from partaking of any food or liquid either too hot or too cold; everything should be abstained from which differs much either way from the ordinary temperature of the system.

The preservation of the teeth and gums greatly depends upon the attention that is paid to cleanliness. Children should be early taught to consider the use of the tooth-brush as a part of the ordinary process of ablution; it will then become a salutary custom. The teeth should be well brushed night and morning, or at the least once a day, and the brush freely used, not being applied merely to the teeth, but also to the gums, as the friction promotes a healthiness of their condition, and prevents a tendency to that sponginess which I have described as scurvy. When there is any tendency to this disease, there is always a degree of tenderness, and the teeth cannot be brushed without causing the gums to bleed; this, however, should not be heeded: "If the gums bleed, you are to persevere the more in the brushing night and morning, until you no longer extract any, which alone is the true sign of their restoration to health*."

* J. P. Clark.

The tooth-brush should be moderately hard; for if a soft one is used, what little elasticity the hairs possess will be entirely removed when the brush is wetted. The individual should endeavour to make the brush penetrate the interstices; and to facilitate this, the action may occasionally be perpendicular, and a brush different from the usual form will be found more convenient for the inside of the under teeth.

*Tooth-powders and Pastes.*—A vast proportion of the dentifrices that are sold, if analyzed, are found to contain some most pernicious ingredient. It is too frequently a mistaken idea with persons, that a tooth-powder should possess the quality of *whitening* the teeth; and without they see some marked improvement from the use of a powder, they think it unserviceable. Unfortunately, however, there are too many who are willing to compound tooth-powders which *shall* possess these qualities. From the nature of the enamel, it is perfectly impossible to alter the colour without its destruction;

it might be as well attempted to change the colour of a diamond. The fault of most tooth-powders is, that they contain either some coarse powder, and thus act upon the enamel mechanically; or an acid, and act by chemical agency. I would, therefore, particularly impress the fact, that a tooth-powder should *not* act in any way upon the teeth; the use of a dentifrice being to cause the water with which the teeth are brushed to become blended with the saliva—with which water alone is not easily miscible—and also with the solid matter deposited upon the teeth.

For this purpose tooth-powders are useful, as they facilitate the removal of the tartar whilst yet in its soft state. Many tooth-powders contain acids which will even remove it when hardened, but this can only be at the sacrifice of the enamel. The same remarks are equally applicable to tooth-pastes, which have become fashionable of late years. A great object in the preparation of either is to make the compound

agreeable to the palate, and to exclude all injurious properties. Their possessing a slight astringency will have a beneficial effect upon the gums.

## ARTIFICIAL TEETH.

I HAVE endeavoured to describe how essential the teeth are to various purposes of life, and need not, therefore, enlarge upon the necessity, when neglect, disease, or accident has caused their removal, of their being replaced by artificial substitutes; which, if properly adapted, are capable of supplying *all* the uses of those with which nature had blessed the individual. Everything depends however, upon their being designed and made by an experienced artist, who must employ those mechanical contrivances best suited to his case.

The art of supplying by substitutes the deficiency of the teeth is of considerable antiquity; and yet, though rapidly improving, it is not comparatively till of late years that it has been brought to its present state of perfection. The dental art has yet, however, failed to receive fully that encouragement which it so well de-

serves. Two circumstances principally have tended to retard the extension of its benefits: viz., the ignorance and consequent incapacity of most of its professors, and the enormous sums charged by them for their inefficient services.

Artificial teeth were formerly carved out of one block of ivory; but this will retain its colour only for a short time. The plan now adopted is to fix natural or artificial teeth upon gold plates; or on sockets formed from the tusk of the Hippopotamus or Sea-horse, which is far superior to ivory, being a much harder and whiter substance. Some dentists use the tusk of the Sea-cow, but this is of an inferior quality to that of the Hippopotamus.

Natural teeth are to be preferred for supplying the deficiency of those organs. Many people, however, have a great prejudice against them, but without cause, as the part of the tooth used is, of course, the crown, which is covered with enamel, and undergoes a thorough cleansing. Duchâteau, a French chemist, as

long back as 1774, invented a description of incorruptible teeth. Since then, numerous other sorts of artificial teeth, called mineral, terro metallic, &c., have been made (principally in France); the whole of which, though some have excelled others, have borne but a very distant resemblance to the natural organs of mastication. Within the last few years, however, a description of teeth have been introduced to dentists in London, which far surpass any that have been previously made, and, in fact, approach as near in appearance to natural teeth as I think it is possible for any artificial object to resemble a natural one. Still I must name an objection which cannot fail to exist even with these—that is, their brittleness, being made of a species of porcelain. It is these which advertising empirics puff, each as being an invention of his own, as "an entirely new description of artificial teeth, which are not subject to change, colour, or decay;"—neglecting to observe, that though not subject to these vital consequences, they are liable to the still

quicker destruction of breakage and of chipping.

In my opinion, nothing can be so comfortable to the patient as natural teeth; as, apart from the liability of these artificial ones to break, they must in the mouth cause a vitreous sensation when in contact with the other teeth, instead of that beautiful smoothness in attrition which the natural organs possess.

When the body of either of the front teeth has been removed from decay, or broken off by accident, and the fang remains in a perfectly sound state, a new crown may be pivotted to the stump, which if done by a skilful artist, will defy the closest inspection. Some practitioners drill the hole for the pivot in so clumsy a manner, as to occasion much pain, and sometimes serious injury; this consequently produces an ill-founded impression, that the operation must be accompanied by great torture.

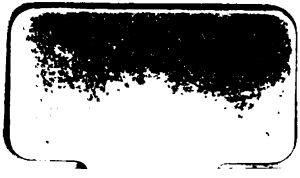
When this plan cannot be adopted, a plate must be made to fit the vacant space or spaces where the deficiency may be; which is to be

made upon a model of the mouth, so as to fit the gum with the greatest accuracy, being adapted with the most perfect nicety to the undulations of that part which it covers. The teeth are then fitted upon gold pins, which should be soldered to the plate; some dentists still use the old method of rivetting them, which is most objectionable, as the heads of the rivets make it impossible that the plate can fit the gum with that accuracy which is required, to give comfort to the patient. The piece is retained in its place by means of small attachments of gold, which form part of the plate, and are adapted to the adjoining teeth. It requires one who is practically acquainted with his profession, to tell upon which of the remaining teeth they should be placed. They are in no way injurious to the remaining teeth if properly applied; though the public would be led to suppose otherwise, by the assertions of charlatans, that they are capable of attaching "artificial teeth, without springs, wires, or ligatures;" but who eventually using them, cause great injury by their misapplication.

When all the teeth are lost, whole sets may be adapted, and are retained in their place by means of the accuracy with which they fit the gums, assisted by a pair of spiral springs, which do not impede any action of the mouth. In some instances, a greater depth is required than would be attained by having the crowns of the teeth, only, attached to the plates. In these cases, the best method is to fix the teeth upon plates carved from the tusk of the Sea-horse, which have been previously accurately fitted to the gum. These may be carved and stained to resemble the gums, before the teeth are attached.

A mistaken impression commonly exists, that artificial teeth cannot be employed without any stumps that may remain being previously extracted: this is an illusion, that has been taken advantage of, as a subject for the advertisements of a certain class of practitioners. The extraction of stumps is *not* necessary if they remain in a healthy state; but where they are at all troublesome, or there is a tendency to disease of the gums, their removal will be decidedly advantageous.

Unfortunately, many who adopt the use of artificial teeth do not derive from them the full benefit that they should; which can only arise from the want of skill in the operator. Many cases are so supplied as to be unserviceable for mastication; others do not remove the defective articulation; whilst it often happens, that a portion of the gold plate to which the teeth are attached is plainly exhibited; thus publishing the fact, that they are but artificial, to all with whom the individual may happen to converse. None of these imperfections, however, should exist; but, as I have previously said, artificial teeth should, and may be made to repair *all* the defects which the loss of the natural organs had occasioned.

THE END.

Printed by H. I. & A. Stevens, Little Tower Street, London.